Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A method of controlling a transducer head velocity during a ramp load/unload comprising the steps of:

measuring the voltages across a Voice Coil Motor ("VCM") and a sense resistor positioned in series with the VCM, wherein the VCM and sense resistor voltage measurements are calibrated at power-up;

calculating the back emf voltage using the measured VCM and sense resistor voltages; and

adjusting the velocity of the transducer head using the calculated back emf voltage.

2. (cancelled)

3. (original) The method of claim 1 wherein the back emf voltage is calculated using a PWM technique.

4. (original) The method of claim 1 wherein the back emf voltage is calculated using an IR cancellation technique.

5. (cancelled)

6. (original) The method of claim 1 wherein a microprocessor calculates the back emf voltage.

7. (original) The method of claim 6 wherein the microprocessor calculates the back emf voltage using a PWM technique.

8. (original) The method of claim 6 wherein the microprocessor calculates the back emf voltage using an IR cancellation technique.

9. (original) The method of claim 6 wherein the microprocessor calculates the back emf voltage using either a PWM technique or an IR cancellation technique.

10. (original) The method of claim 6 wherein the microprocessor sends a signal to a control circuit to adjust the velocity of the transducer heads.

11. (original) The method of claim 10 wherein the signal is sent real-time to the control circuit.

12. (cancelled)

13. (cancelled)

14. (cancelled)

15. (cancelled)

16. (currently amended) A method of controlling a transducer head velocity during a ramp load/unload comprising the steps of:

setting a target velocity;

measuring the voltages across a voice coil motor ("VCM") and a sense resistor in series with it;

calculating a back EMF voltage using the measured voltages across the VCM and the sense resistor;

calculating a velocity error using the target velocity by calculating the velocity of the transducer head in discrete-time using the measured back emf voltage and comparing the velocity of the transducer head and the target velocity; and

adjusting the transducer head velocity using the velocity error.

17. (cancelled)

18. (original) The method of claim 16 further comprising the step of:

employing the Proportional-Integral control technique.

19. (cancelled)

20. (original) The method of claim 16 further comprising the step of:

sending a signal to a driver circuit that controls the velocity of the transducer heads.

21. (original) The method of claim 20 wherein the step of sending a signal to a driver circuit further comprises:

calculating a control variable using the velocity error; and

sending the value of the control variable to a driver circuit.

22. (original) The method of claim 21 wherein the velocity error is calculated in discrete-time.

23. (original) The method of claim 22 further comprising:

setting the velocity error variable for a previous sampling period equal to the voltage error variable for the current sampling period.

24. (original) The method of claim 23 further comprising:

setting the control variable for a previous sampling period equal to the control variable for a current sampling period.

25. (original) The method of claim 16 further comprising the step of:

disabling the VCM at the completion of the load/unload.

26. (original) The method of claim 25 further comprising the step of:

stopping the control of the transducer head at the completion of the ramp load/unload.

27. (currently amended) A method of measuring a transducer head velocity during a ramp load/unload comprising the steps of:

measuring the voltages across a voice coil motor ("VCM") and a sense resistor in series with the VCM;

calculating the back EMF voltage using the measured voltages across the VCM and the sense resistor; and

calculating the velocity error using the back EMF voltage wherein the velocity of the transducer head is calculated in discrete-time.

28. (cancelled)

29. (original) The method of claim 27 further comprising:

using a velocity from a previous sampling period to determine a velocity for the current sampling period.

30. (cancelled)

31. (cancelled)

32. (cancelled)

33. (currently amended) A disk drive comprising:

an actuator assembly having a voice coil motor that has an internal resistance;

a driver circuit for connecting and driving the actuator assembly;

a sense resistor in series with the voice coil motor;

a first operational amplifier for magnifying the voltage across the VCM resistance;

a second operational amplifier for magnifying the voltage across the sense resistor; and

a multiplexer for multiplexing the outputs of the operational amplifiers, whereby back emf voltage is determined by measuring the based on the amplified voltages across the VCM and sense resistor.

34. (original) The disk drive of claim 33 further comprising:

a microprocessor for connecting to and sending an input signal to the driver circuit.

35. (original) The disk drive of claim 33 wherein:

the microprocessor calculates the velocity of the voice coil motor and sends a signal based on the velocity to the driver circuit.

36. (cancelled)

37. (cancelled)

38. (currently amended) The disk drive of claim [[35]] 33 further comprising:

an analog-to-digital converter for converting the multiplexed voltages to a digital form receivable by the microprocessor.

39. (original) The disk drive of claim 38 wherein the analog-to-digital converter uses 12-bits.

40. (original) The disk drive of claim 38 wherein the analog-to-digital converter has a full-scale voltage of 5 Volts.

41. (original) The disk drive of claim 38 wherein the analog-to-digital converter has a resolution on the order of 1 mV/count.

42. (original) The disk drive of claim 33 wherein the back emf voltage may be calculated using either a PWM technique or an IR cancellation technique.

43. (new) A method of controlling a transducer head velocity during a ramp load/unload comprising the steps of:

measuring the voltages across a Voice Coil Motor ("VCM") and a sense resistor positioned in series with the VCM;

selecting between a PWM technique and an IR cancellation technique, using a microprocessor, to calculate the back emf voltage using the measured VCM and sense resistor voltages; and

adjusting the velocity of the transducer head using the calculated back emf voltage.

44. (new) A method of controlling a transducer head velocity during a ramp load/unload comprising the steps of:

measuring the voltages across a Voice Coil Motor ("VCM") and a sense resistor positioned in series with the VCM through separate reference voltage paths;

calculating the back emf voltage using the measured VCM and sense resistor voltages; and

adjusting the velocity of the transducer head using the calculated back emf voltage.

45. (new) The method of claim 44 further comprising the step of applying a current to the VCM to start/stop the movement of the transducer head.

46. (new) The method of claim 44 further comprising the step of:

using the value for the voltages across the VCM and the sense resistor to calculate a calibration constant.

47. (new) The method of claim 46 wherein calculating the calibration constant further comprises the steps of:

comparing the voltage measured on a first reference voltage path with the voltage measured across the VCM; and

comparing the voltage measured on a second reference voltage path with the voltage measured across the sense resistor.

48. (new) A method of measuring a transducer head velocity during a ramp load/unload comprising the steps of:

measuring the voltages across a voice coil motor ("VCM") and a sense resistor in series with the VCM through separate reference voltage paths;

calculating the back EMF voltage using the measured voltages across the VCM and the sense resistor; and

calculating the velocity error using the back EMF voltage.

49. (new) The method of claim 48 further comprising the step of:

using the value for the voltages across the VCM and the sense resistor to calculate a calibration constant.

50. (new) The method of claim 49 wherein calculating the calibration constant further comprises the steps of:

comparing the voltage measured on a first reference voltage path with the voltage measured across the VCM; and

comparing the voltage measured on a second reference voltage path with the voltage measured across the sense resistor.